Taxonomic revision of Australian Myrsinaceae: *Ardisia* Sw. and *Tetrardisia* Mez

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Summary

Jackes B.R. (2009). Taxonomic revision of Australian Myrsinaceae: *Ardisia* Sw. and *Tetrardisia* Mez. ***Austrobaileya* 8(1): 1–23**. In this revision of *Ardisia* Sw., in Australia, eight species are recognized. This includes *Ardisia sanguinolenta* Blume which occurs on Christmas Island and other non-Australian areas, and two introduced and naturalised species *A. crenata* Sims and *A. elliptica* Thunb. Five species are restricted to Queensland and northern New South Wales. *Ardisia brevipedata* ?var. *depauperata* Domin is newly recognized as the species *Ardisia depauperata* (Domin) Jackes. *Ardisia bifaria* is again included in the genus *Tetrardisia* as *T. bifaria* (C.T.White & W.D.Francis) C.T.White. Descriptions, illustrations and distribution maps of all Australian mainland species are provided, as well as a species identification key.

Key Words: Myrsinaceae, *Ardisia*, *Ardisia depauperata*, *Tetrardisia*, *Tetrardisia bifaria*, Australian flora, taxonomy, nomenclature, identification keys

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Introduction

Ardisia Sw. is a large genus with 250–300 species in the family Myrsinaceae (Ericales). Mez (1902) divided the genus into 14 subgenera. Hu (1999) in a review of Asiatic *Ardisia* considered that although there were exceptions, these divisions worked reasonably well. Ståhl & Anderberg (2004) in a phylogenetic review of the Myrsinaceae recognized a number of these subgenera as genera, including the previously recognized genus *Tetrardisia* Mez.

Ardisia and *Tetrardisia* as circumscribed by Ståhl & Anderberg (2004) can be distinguished from other genera in the family by a combination of morphological characters: inflorescence a raceme or paniculate (although it may be much reduced); corolla lobes fused at the base, imbricate and twisted to the right; staminal filaments short; style filiform, at least twice as long as the ovary. The two genera may be distinguished with the following key.

Key to *Ardisia* and *Tetrardisia* in Australia

Leaves distinctly petiolate; flowers 5-merous . . . . **Ardisia**
Leaves sessile or subsessile; flowers 4-merous . . . . **Tetrardisia**

Materials and methods

This revision was based on an assessment of morphological characters from about 350 dried herbarium specimens, as well as from fresh material and field observations. Herbarium specimens were examined from the following herbaria BRI, CANB, CNS (formerly QRS), K, L, MEL, MO and NSW. Acronyms used here to indicate herbaria holding particular specimens are those listed by Holmgren *et al.* (1990). Species in this paper are listed alphabetically. All measurements are based on dried material unless otherwise stated. All measurements of the peduncle refer to the peduncle + rhachis.

Secretory structures of a schizogenous origin are present in all organs; however, they are uncommon in anthers of all species examined. These structures are referred to

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here as glands. All were examined under a microscope and it was noted that there was some variation in shape and colour between species, but these characters were constant within a species. All observations are based on dried material unless otherwise noted. In thick leaves it was often hard to discern the small, globular, deep red glands, but the presence of larger globular and lineate glands were easily observed on the surface. When viewed with a hand lens or the naked eye they often appear as black dots or streaks. Present on all leaves were capitate 'scales' sunken into the surrounding epidermis. These 'scales' were recorded for *Ardisia pachyrrhachis* (F.Muell.) F.M.Bailey by Blüthen & Reifenrath (2003) as extrafloral nectaries. Uniseriate trichomes were observed on various organs, but chiefly on the corolla tube interspersed with the staminal filaments. Glandular papillae may be present on various organs as on the pedicels of *A. bakeri* C.T.White.

Taxonomy of *Ardisia*

Ardisia comprises about 250 species as circumscribed by Ståhl & Anderberg (2004). These occur in tropical and subtropical areas, particularly in Southeast Asia, and the Pacific Islands east to Fiji. Although well developed in the Asian region several representatives are found in tropical America. Five species are endemic to mainland Australia. Two species, *A. crenata* Sims and *A. elliptica* Thunb., which were introduced as garden plants are now weeds of environmental concern. Another species *A. colorata* Roxb. occurs on Christmas Island as well as in India, southern China and areas east to Java.

***Breeding systems*:** Self-compatibility appears to be common in the genus although only about seven species have been studied (Bawa 1974; Bawa *et al.*, 1985; Pascarella 1997). In *Ardisia elliptica* Thunb. at least 75% of the seeds produced from experiments for autogamy were viable and this was higher than in the other species tested (Pascarella 1997). He also showed that in several species seed set was higher when cross-pollination occurred. Protogyny, where the stigma extends beyond the unopened corolla a day prior to anthesis, has been reported for a number of species (Tomlinson 1974; Pascarella 1997). Although no detailed studies have been conducted, the stigma of *A. brevipedata* F.Muell., has been observed to extend beyond the corolla prior to anthesis (*pers. obs*).

Ardisia Sw., *Nov. Gen. Sp. Prodr.* 48 (1788), *nom. cons.* **Type:** *Ardisia tinifolia* Sw. (*nom. cons.*).

Bladhia Thunb., *Nov. Gen. Pl.* 1: 6 (1781). **Type:** *Bladhia japonica* Thunb.

Small trees or shrubs, rarely climbing (non-Australian); branchlets usually flattened at the point of attachment to the stem. Leaves petiolate, simple, alternate, spirally arranged or distichous, usually coriaceous, margins entire to crenate, sometimes undulate, surface glabrous or with peltate glandular scales, rarely with hairs (non-Australian); glands globose and/or lineate, sometimes obscure. Inflorescence a raceme, usually appearing umbelliform or paniculate (non-mainland Australia), often terminating in short lateral branches, in non-Australian species may be cymose, appearance often depends on the spacing of the pedicels. Flowers bisexual, 5 (rarely 6)-merous, pedicellate. Calyx free or fused at the base, persistent, glands usually present. Corolla rotate, campanulate to urceolate (non-Australian), white to pink, lobes fused at base, imbricate in bud, overlapping to the right and often recurved or widely spreading after anthesis, glands present. Stamens free or adnate to the corolla tube near the base; filaments short, rarely absent, base usually fused to form a short tube or rim fused to the corolla-tube; anthers sagittate, introrse, longitudinally dehiscent, rarely opening by pores (non-Australian), erect, often forming a cone around the style. Ovary superior, globose to conical tapering into a filiform style which is sometimes exserted from the bud; the style is more than twice as long as the ovary: stigma punctiform, placenta basal; ovules few to numerous embedded in the placenta, uniseriate to multiseriate. Fruit a drupe, globose to subglobose, with a persistent style or scar at the apex, endocarp hard. Seed 1, endosperm firm, embryo transverse, cylindrical.

***Etymology*:** from the Greek *ardis* - sharp or a point, referring to the shape of the stamens and/or the protruding slender style.

Key to species of *Ardisia* in Australia including Christmas Island and naturalised species

1 Leaves distichous or 2-ranked . . . . **1. A. bakeri**
1. Leaves spirally arranged, not distichous or 2-ranked 2

2. Margins of lamina crenate with glands/nodules in the sinuses . . . . **3. A. crenata**
2. Margins of lamina usually entire, glands/nodules absent from sinuses 3

3 Corolla lobes shorter than corolla-tube . . . . **6. A. fasciculata**
3. Corolla lobes longer than the corolla-tube 4

4 Inflorescence paniculate (Christmas Island) . . . . **8. A. sanguinolenta**
4. Inflorescence a short raceme, often appearing subumbellate or condensed 5

5 Leaf margins recurved, pedicels >10 mm long . . . . **7. A. pachyrrhachis**
5. Leaf margins not revolute, pedicels<10 mm long 6

6 Mature fruits purplish-red to black . . . . **5. A. elliptica**
6. Mature fruits white, pink to red 7

7 Flowers usually 12–25 per inflorescence, flowers 3–4 mm long . . . . . . **2. A. brevipedata**
7. Flowers usually 5–8 per inflorescence, flowers 2–2.5(–3) mm long . . . . . **4. A. depauperata**

1. Ardisia bakeri C.T.White, *Proc. Roy. Soc. Queensland* 53: 223 (1942); *Ardisia racemosa* F.Muell. ex R.T.Baker *nom. illeg.*, *non* Sprengel (1824), *nec* Mez (1902), *Proc. Linn. Soc. N.S.W. Series* 2, 27(4): 380 (1902). **Type:** New South Wales. North Coast: Tumbulgum, October 1897, *W.Bäuerlen 1983* (holo: NSW259659; iso: BRI, K).

Illustration: Harden (2000: 502).

Shrub or small tree, 1.5–5(–9.5) m tall; bark grey, smooth; branching sparse to abundant, branchlets usually zig-zag, some very small leaves usually present near base of branchlets. Leaves distichous, petiolate; petiole 3–7 mm long, reddish, weakly marginate, flat on adaxial surface. Lamina chartaceous, elliptic, often somewhat asymmetrical, (1.5–) 4.8–12.5 cm long, (0.7–) 1.5–3.6 cm wide; apex obtuse to acuminate, base cuneate, adaxial surface dull to glossy green, abaxial surface paler, glabrous except for scattered scales, margins may be undulate and weakly recurved, midrib depressed on adaxial surface, prominently raised on abaxial surface; lateral veins may be relatively inconspicuous, 13–25 pairs on either side of the midrib irregularly looping near the margins; glands of of both types, irregularly globular, reddish and more frequent near the margins, often visible as bumps on the adaxial surface, when lineate appearing black with a length:width ratio up to 10:1, chiefly visible on the abaxial surface, the latter are not always present in every leaf. Inflorescence an axillary raceme, appearance depends on the spacing of the pedicels, may appear subumbellate or congested, to 2 cm long; flowers 3–7(–10) per inflorescence; peduncle and pedicels reddish; pedicels filiform, 2–5(–10) mm long, scattered glandular papillae often present, glands dark red, globular to shortly lineate, density variable; subtending bracts chartaceous and soon caducous, *c.* 1.5 mm long and 0.75 mm wide at base; glands globular reddish, margins scarious. Flowers 5-merous, 2–3 mm long. Calyx 5-lobed, green; tube 0.1–0.2 mm long, lobes triangular 1–1.5 mm long, 0.75–1 mm wide at base, glands globular red to dark red, margins scarious. Corolla rotate, white to pinkish-red; tube 0.2–0.4 mm long, lobes usually widely spreading after anthesis, 2–2.5 mm long, 1–1.5 mm wide, median portion of lower half of lobe thickened on adaxial surface, papillae present, uniseriate hairs present at junction of corolla-tube and lobes; glands pale to dark red, margins scarious. Stamens opposite the petals; base of filaments fused to form a small rim, free portion flattened, *c.* 0.2 mm long; anthers 2-locular, cordate-sagittate tapering into a subulate, sometimes curved point, *c.* 2 mm long and 0.75 mm wide at base, 0–4 reddish globular glands may be present on the connective. Ovary globose to conical tapering into the style, *c.* 1 mm diameter; glands globular to shortly lineate, dark red to black; style 1.5–2 mm long, glands usually sparse; stigma punctiform. Ovules multiseriate, 9–14 embedded in the placenta. Fruit globular, 5–7(–10) mm diameter, black at maturity, glands globular to shortly lineate, dark red to black, style persistent to 2 mm long. Seed globular, *c.* 4 mm long and 4 mm diameter. **Fig. 1.**

***Additional selected specimens (from c. 21 examined)*:** **Queensland.** Moreton District: Lyrebird Ridge Road, Springbrook, Nov 2000, *Bean 16995* (BRI, MEL); near Lyrebird Ridge Road, Springbrook, Dec 1990, *Bird & Tucker s.n.* (BRI [AQ502600], CANB [CBG]); Lyrebird Ridge Road Pottery, Springbrook, Dec 1990, *Forster PIF7703* (BRI, NSW); Tomewin on Queensland side of Queensland/New South Wales border, Sep 1984, *Jones s.n.* (BRI[AQ440726]). **New South Wales**. North Coast: Tweed River, May 1901, *Campbell 105* (NSW); Couchy Creek below Sphinx Lookout, south side of Springbrook plateau, May 1977, *Floyd 353* (NSW); on NSW/QLD border south of Mt Cougal, Aug 1986, *Floyd AGF2148* (BRI, NSW); *c.* 1 km along QLD–NSW border track from Numinbah gate, Nov 1982, *Guymer 1810 & Jessup* (BISH, BRI, CANB, L, NSW).

***Distribution and habitat*:** In the late 19th Century and early 20th Century collections of *Ardisia bakeri* were made in rainforest along the gullies associated with the Tweed River. However, no recent collections have been made in these areas. Extant populations appear to be restricted to the Springbrook Plateau (28°12′S, 153°18′E) and associated areas of the McPherson Range (**Map 1**). It is locally common in complex or notophyll vine forests at altitudes up to 1000 m. Soils are chiefly basaltic in origin. Conservation status is listed as **Rare** in both Queensland and New South Wales.

***Phenology*:** The main flowering period is from September to November; fruits have been collected from December to May.

***Notes*:** This species is readily identified by the 2-ranked and petiolate leaves. It is the only species examined where the median region of the adaxial surface of the corolla lobes is thickened and papillate.

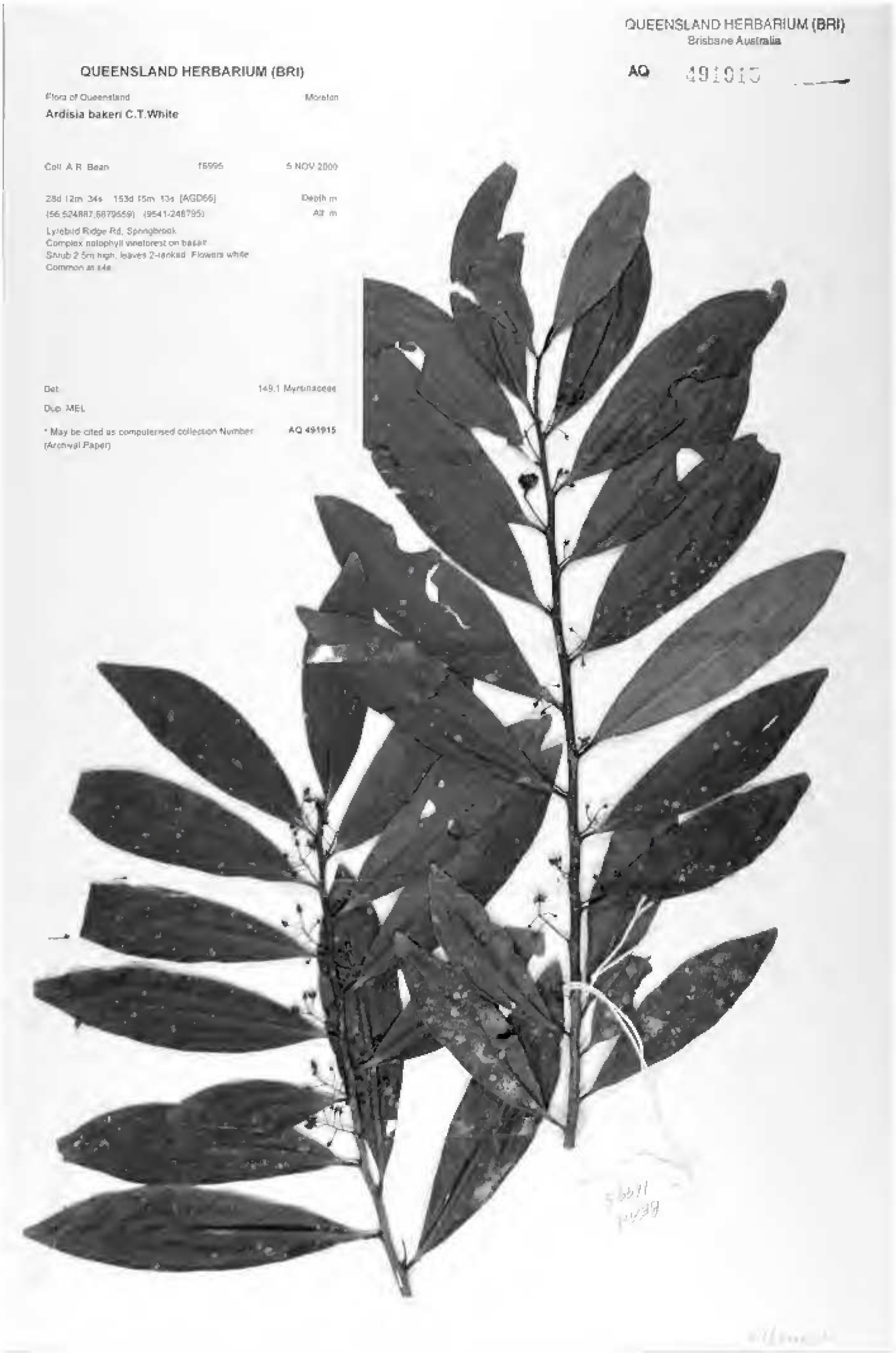
White (1942) renamed this species on discovery that Baker's name was invalid. Although at the time he stated "comb.nov." basing his new name on Baker's invalidly named species, the name has been treated as a *nomen novum* and this was undoubtedly the intention at the time.

***Etymology*:** Named after R.T. Baker (1854–1941) an economic botanist, who became curator of the Sydney Technological Museum and also a forestry lecturer at the University of Sydney. He was awarded the Mueller medal in 1921 and the Clarke Medal in 1922 for his contributions to chemotaxonomy particularly of the eucalypts.

2. Ardisia brevipedata F.Muell., *Fragm.* 6: 163 (1868); *Bladhia brevipedata* (F.Muell.) F.Muell. *Vict. Nat.* 8: 16 (1891); *Ardisia brevipedata* var. *brevipedata* Domin, *Biblioth. Bot.* 89: 502 (1928). **Type:** Queensland. North Kennedy District: Rockingham Bay, 16 October 1868, *Dallachy s.n.* (lecto [here chosen]: MEL1612562; isolecto: K, MEL162563).

***Illustration*:** Cooper & Cooper (2004: 334).

Shrub or small tree 1.5–3(–6) m tall; bark smooth; branches tend to be held at more than 45° to the main stem, branchlets often with a slight zig-zag. Leaves alternate, petiolate; petiole 0.5–7(–10) mm long, reddish, weakly marginate, flat on adaxial surface. Lamina chartaceous, elliptic to obovate, 4.4–16.9 cm long, 1.1–4.7 cm wide, adaxial surface glossy green, abaxial surface paler, glabrous except for scattered scales; apex obtuse to acuminate, base cuneate, margins smooth, may be slightly recurved, midrib flat or slightly depressed on adaxial surface, raised on abaxial surface; lateral veins relatively inconspicuous, more than 20 per side of midrib; glands pellucid when fresh, appearing black when dry, from irregularly globular to lineate, with a length: breadth ratio up to 12:1. Inflorescence axillary, subumbellate to umbellate to 2 cm long; flowers 12–25 per inflorescence, if less then by abortion, peduncles 2–10 mm long, reddish; pedicels filiform, 5–12 mm long, reddish, glands globular to shortly lineate, dark red often appearing black; subtending bracts soon caducous, 1–2 mm long, 0.5–1 mm wide, glands dark. Flowers 5-merous rarely 6,



QUEENSLAND HERBARIUM (BRI)

Flora of Queensland Moreton

Ardisia bakeri C.T.White

Coll. A.R. Bean 16995 5 NOV 2000

28d 12m 34s 153d 15m 13s [AGD66] Depth m

(56,524887,6879659) (9541-248795) Alt m

Lyrebird Ridge Rd, Springbrook
Complex notophyll vineforest on basalt
Shrub 2.5m high, leaves 2-ranked. Flowers white
Common at site

Det. 149.1 Myrsinaceae

Dup. MEL

* May be cited as computerised collection Number AQ 491915
(Archival Paper)

QUEENSLAND HERBARIUM (BRI)
Brisbane Australia

AQ 491915

Fig. 1. Representative specimen of ***Ardisia bakeri*** (*Bean 16995* [BRI]).

3–4 mm long. Calyx 5-lobed; tube 0.25–0.5 mm long, broadly triangular, lobes spreading after anthesis, 0.75–2 mm long, margins scarious, glands globular to shortly lineate, mostly dark red, occasionally orange. Corolla rotate, white to cream to pale pink; tube *c.* 1 mm long, lobes spreading after anthesis to 3 mm long, *c.* 1 mm wide, apex often weakly reflexed, glands dark red often appearing black, chiefly lineate, length variable. Stamens connivent around the style; base of filaments fused to form a rim, attached to corolla-tube, uniseriate hairs dense on rim, free portion of filament 0.2–1 mm long; anthers 1.5–2 mm long, *c.* 1 mm wide at base, occasional dark gland present on connective, apex apiculate. Ovary globose, 1–1.5 diameter, tapering into style, dark-coloured. Style 2–3 mm long, twisted near apex, red-coloured when fresh; glands if present, dark red; stigma punctiform. Ovules uniseriate, 2–4 embedded in placenta, only 1 maturing. Fruit globular to depressed globular, 4–7 mm long, 5–7 mm diameter, red at maturity, glands dark red and usually dense. Seed depressed globular, 4–5 mm long, 5–6 mm diameter, testa brown. *rambling spearflower*. **Fig. 2.**

***Additional selected specimens (from c. 118 examined)*:** **Queensland.** Cook District: 1 km SW of the Twin Forks, headwaters of the Annan River, Jun 1992, *Forster PIF10741 et al.* (BRI); Home Rule, base of Mt Hedley, 3 km E of Rossville, Apr 1999, *Forster PIF24261 & Booth* (BRI); Headwaters of Coopers Creek, 3.5 km W of Thornton Beach, Jun 1988, *Forster PIF4385 & Tucker* (BRI, CANB, L); Castle Rock, 33.7 km from Mt Carbine road on road to Spencer Creek Forestry Camp, Mount Windsor Tableland, Whypalla, Nov 1990, *Holland 14 & Hind* (NSW); S.F.R. 675, East Mulgrave L.A., Jan 1977, *Gray 269* (BRI); Longlands Gap, S.F. 353, Jun 1995, *Forster PIF16786* (BRI); N.P.R. 904, Parish of Palmerston, Feb 1997, *Hyland 15588* (CNS); NW of Tully, May 2005, *Ford 4643* (CNS). North Kennedy District: Murray Falls, Murray Upper, Dec 1987, *Irvine 2334* (CNS); Hinchinbrook Island, *c.* 2 km NW of Mt Diamantina, Dec 2000, *Kemp TH2582 & Kutt* (JCT); Burgoo L.A., Garrawalt, Jul 1975, *Sanderson 675* (CNS); Near Gumburu Environmental School, Paluma, Dec 2005, *Jackes 431* (JCT).

***Distribution and habitat*:** *Ardisia brevipedata* is endemic to north-east Queensland where it occurs as an understory shrub or small tree. It is usually found on the margins or in rainforest habitats usually above 500 m altitude, although it has been collected in lowland areas. This widespread species extends from Paluma in the south (*c.* 19°S) to the Bloomfield – Windsor Tableland area (*c.* 15°49′S) in the north (**Map 2**).

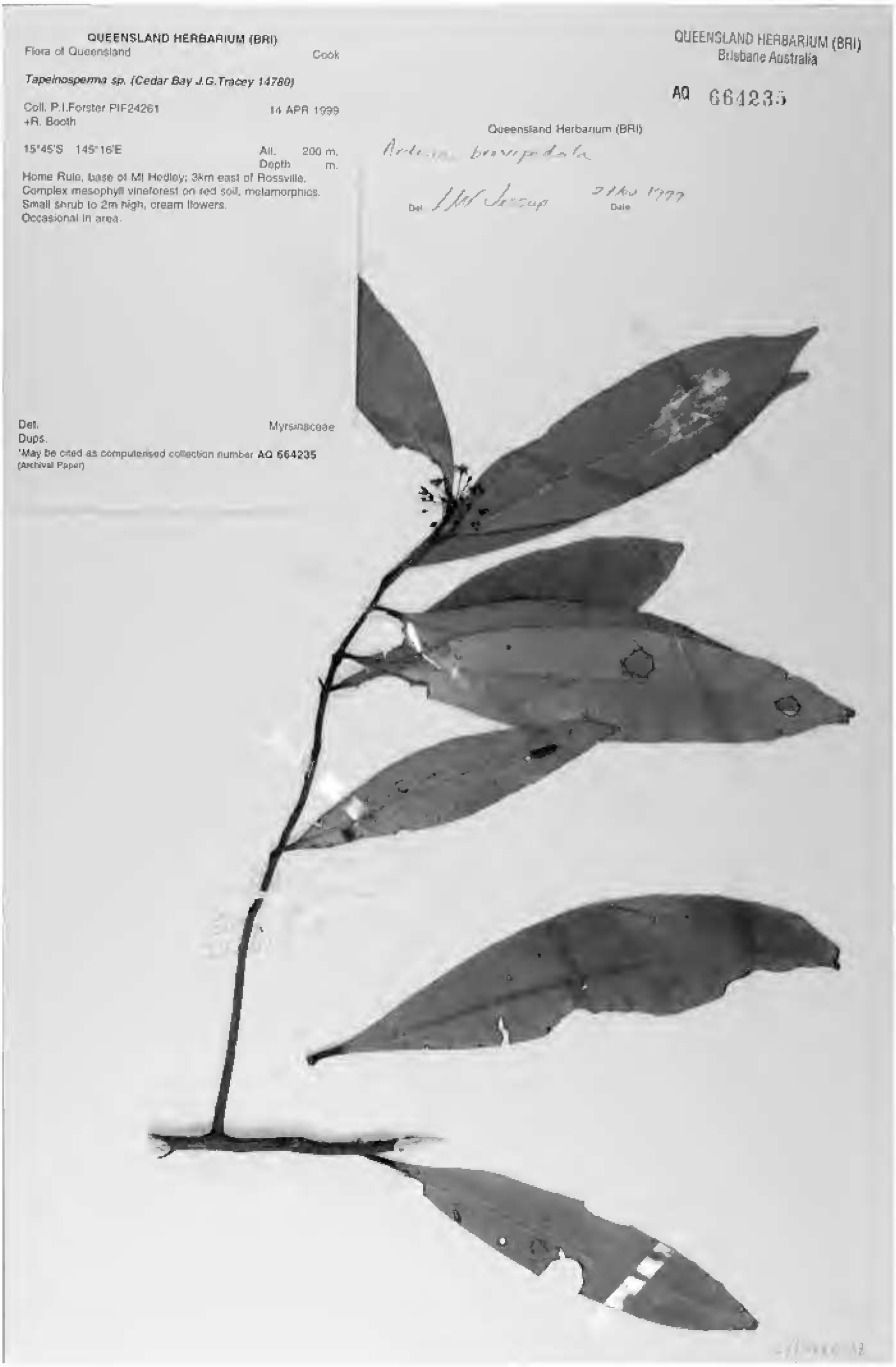
***Phenology*:** Flowers have been collected in every month but chiefly from October to January. Fruits have been collected throughout the year.

***Notes*:** Hu (1999) considered that *Ardisia apus* Mez from New Guinea was synonymous with *A. brevipedata*; however, the type description of the former refers to gland-like thickish points on the margin of the adaxial surface. Such glands were absent for all specimens of *A. brevipedata* examined. Unfortunately the type specimen of *A. apus* has been lost and according to Sleumer (1988) no other collections had been made. The type specimen, *Ledermann 12015* was collected in the Schrader mountains of the Sepik district in Papua New Guinea. Hu (1999) indicates that collections of *A. apus* have been recorded from the Papua New Guinean provinces of East Sepik, Morobe and Milne Bay and Hollandia province in Indonesian Papua.

***Etymology*:** From the Latin *brevi* – short and *pedatus* – foot, referring to the peduncles which are often short.

3. Ardisia crenata Sims, *Bot. Mag.* 45: *t.* 1950 (1817); *Bladhia crenata* (Sims) H.Hara, *Enum. Spermatoph. Jap.* Part 1:75 (1948). **Type:** China (Based on Plate 1950, *Bot. Mag.*, from material collected/ cultivated by Loddiges – Cambridge Botanical Garden).

Shrub to 1.5(–3) m tall; stem glabrous or initially with minute glandular papillae. Leaves spirally arranged, petiolate; petiole narrowly marginate, 6–10 mm long; lamina coriaceous, elliptic-lanceolate, oblanceolate, rarely ovate, 6–20 cm long, 2–4 cm wide, discolorous, glabrous except for peltate scales more common on abaxial surface than adaxial surface; apex acute to acuminate, base cuneate, margins crenate, undulate and revolute, nodules or secretory trichomes prominent in the sinuses; midrib raised in a shallow groove on adaxial surface, raised on abaxial surfaces; lateral veins 12–18 pairs on either side of the midrib, looping near



QUEENSLAND HERBARIUM (BRI)
Flora of Queensland Cook

Tapeinosperma sp. (Cedar Bay J.G.Tracey 14780)

Coll. P.I.Forster PIF24261 14 APR 1999
+R. Booth

15°45'S 145°16'E Alt. 200 m.
Depth m.

Home Rule, base of Mt Hedley; 3km east of Rossville.
Complex mesophyll vineforest on red soil, metamorphics.
Small shrub to 2m high, cream flowers.
Occasional in area.

Det. Myrsinaceae
Dups.
'May be cited as computerised collection number AQ 664235
(Archival Paper)

QUEENSLAND HERBARIUM (BRI)
Brisbane Australia

AQ 664235

Queensland Herbarium (BRI)
Ardisia brevipedata

Det. L.W. Jessup Date 21 Nov 1999

Fig. 2. Representative specimen of ***Ardisia brevipedata*** (*Forster & Booth PIF24261* [BRI]).

the margin to form a distinct marginal vein; glands irregularly globose, reddish-orange, visible as bumps on both surfaces when dry. Inflorescence terminates a lateral shoot, umbelliform to 4 cm long and 10 cm wide, 6–14 flowers per umbellate cluster; subtending bracts 2–3 mm long, *c.* 1.5 mm wide at base, strongly keeled mid section, glands variable dark-coloured. Flowers 5-merous, 6–7 mm long; pedicels 6–10 mm, glands both dark lineate and globular, chiefly orange-coloured. Calyx campanulate, to 2 mm long and 1.5 mm wide at base, glands globular dark red in lower portion, orange towards apex. Corolla rotate, white; tube *c.* 0.2 mm, lobes spreading, *c.* 6 mm long, 4 mm wide at base, glandular papillae in lower portion, glands globular to shortly lineate, dark red and/or orange-coloured. Stamens opposite the petals; base of filaments fused to form a rim attached to the corolla-tube, free portion of filament flattened, *c.* 1 mm long; anthers to 3 mm long, *c.* 1.5 mm wide towards the base, globular dark red glands on abaxial surface, dehiscence initially by small apical pores then splitting longitudinally. Ovary conical, *c.* 1 × 1 mm, tapering into style, glands orange; style *c.* 2 mm long, orange glands present; ovules 3–5 at base of depressed-globose placenta. Fruit globose, 6–8 mm diameter, red, glands dark red, scattered. Seed depressed globular, *c.* 5 mm long, 5–6 mm diameter, testa light brown. *coralberry, spiceberry.* **Fig. 3.**

***Selected specimens (from c. 26 examined)*: Queensland.** Cook District: Environmental Park, Kuranda, Nov 1992, *Swarbrick s.n.* (BRI [AQ533671]); 100 Herberton Road, Atherton, May 1997, *Gray 7172* (CNS); Weinets Creek, Babinda, Oct 2000, *Forster PIF26375 et al.* (A, BRI, K, MEL). North Kennedy District: Alcock Forest Reserve, rafting access point 9, 5.2 km from Tully River camping area, Feb 2002, *Ford AF3277 & Holmes* (BRI). Port Curtis District: Richter's Road, N of Watalgan, Aug 1996, *Bean 10515 & Baumgartner* (BRI). Wide Bay District: Near Lake Cooroibah, Aug 1986, *Sandercoe C1187 & Milne* (BRI). Moreton District: *c.* 1 km W of Beerwah, Caloundra Shire, Jun 2003, *Sanders s.n* (BRI [AQ776446]); Mt Cougal N.P., south west of Currumbin, *Bean 16671* (BRI). **New South Wales**. North Coast: 700 m along the Mullumbimby road from its junction with the Pacific Highway, Dec 1994, *Parker s.n.* (NSW364039).

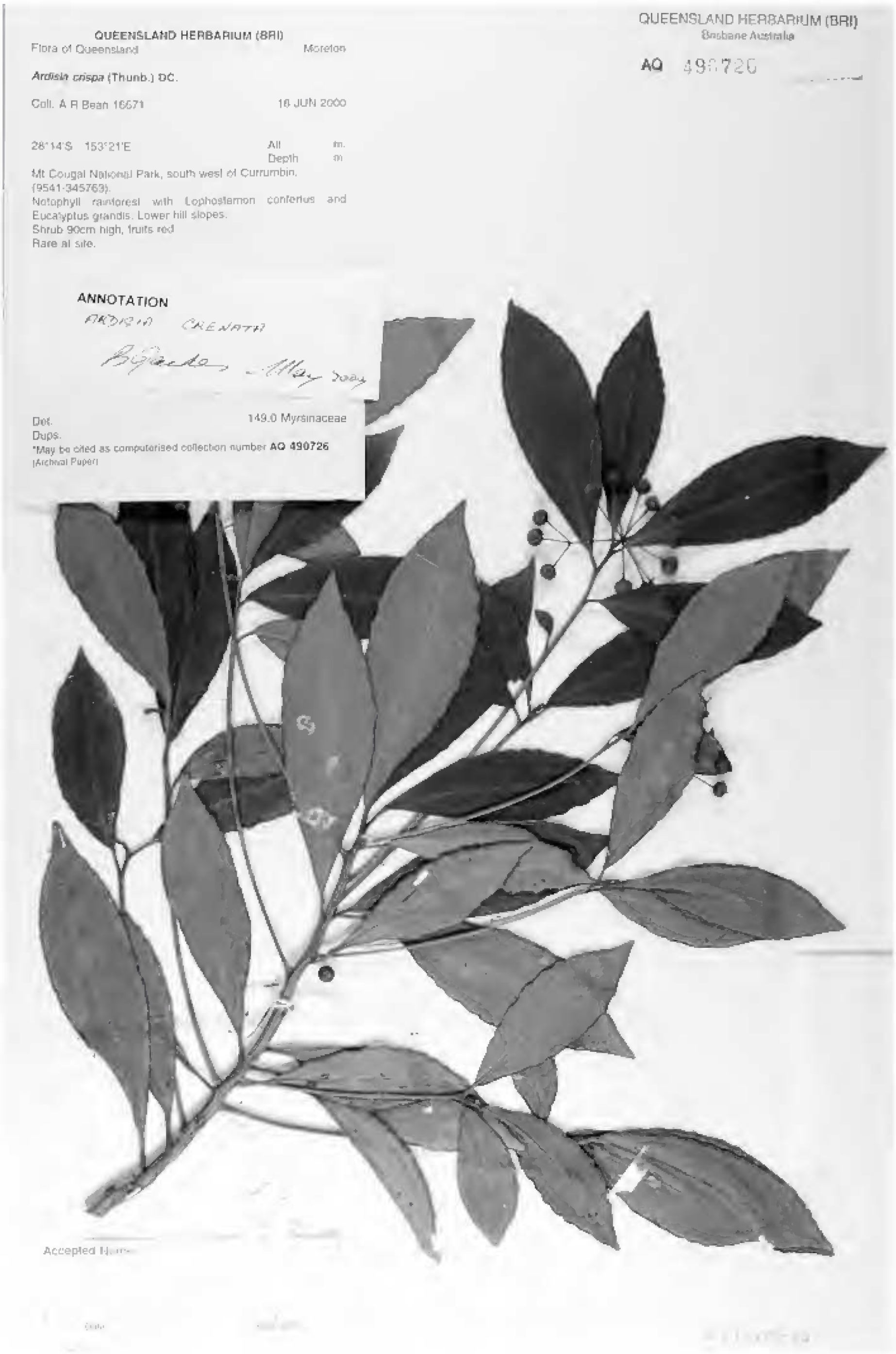
***Distribution and habitat*:** A native of the Asian region extending from India to Japan and into the Malaysian area (Malesian subkingdom). This commonly cultivated plant has become naturalised, chiefly in urban localities as well as along margins of rainforest and in wet sclerophyll forest in moist shady sites. It is currently found in eastern Australia from *c.* 16°30′S to 29°S (**Map 3**). Since fruits are dispersed by birds, this species has the potential to spread into more localities.

***Phenology*:** Flowering occurs in spring and summer. Ripe fruits present from autumn to early summer.

***Notes*:** *Ardisia crenata* has often been confused in the literature with *A. crispa* (Thunb.) A.DC. The source of this confusion is outlined by Walker (1939). Based on descriptions by Chen & Pipoly (1995) and Yang (1999), supplemented by herbarium material these two species may be distinguished as follows:

A. crenata	Rhizomes absent; branchlets glabrous; leaf lamina elliptic-lanceolate to oblanceolate, rarely ovate; lateral veins 12–18 pairs on either side of the midrib uniting to form a distinct marginal vein; marginal glands/nodules prominent in the sinuses pale when dry; anthers with reddish glands on the abaxial surface.
A. crispa	Creeping rhizomes present; branchlets pubescent; leaf lamina narrowly oblong-lanceolate to linear-lanceolate, rarely elliptic-lanceolate; lateral veins *c.* 8 pairs on either side of the midrib, marginal veins absent or obscure if present; marginal glands/nodules in the sinuses small, when dry almost black; anthers lack glands on the abaxial surface.

All specimens in Australian herbaria with crenate margins and nodules in the sinuses were identified as belonging to *Ardisia crenata*. Kitajima *et al.* (2006) suggest that the selection of desirable traits for cultivation may have increased the potential invasiveness of this species.



QUEENSLAND HERBARIUM (BRI)
Flora of Queensland Moreton

Ardisia crispa (Thunb.) DC.

Coll. A R Bean 16671 16 JUN 2000

28°14'S 153°21'E Alt m.
Depth m
Mt Cougal National Park, south west of Currumbin.
(9541-345763).
Notophyll rainforest with Lophostemon confertus and Eucalyptus grandis. Lower hill slopes.
Shrub 90cm high, fruits red
Rare at site.

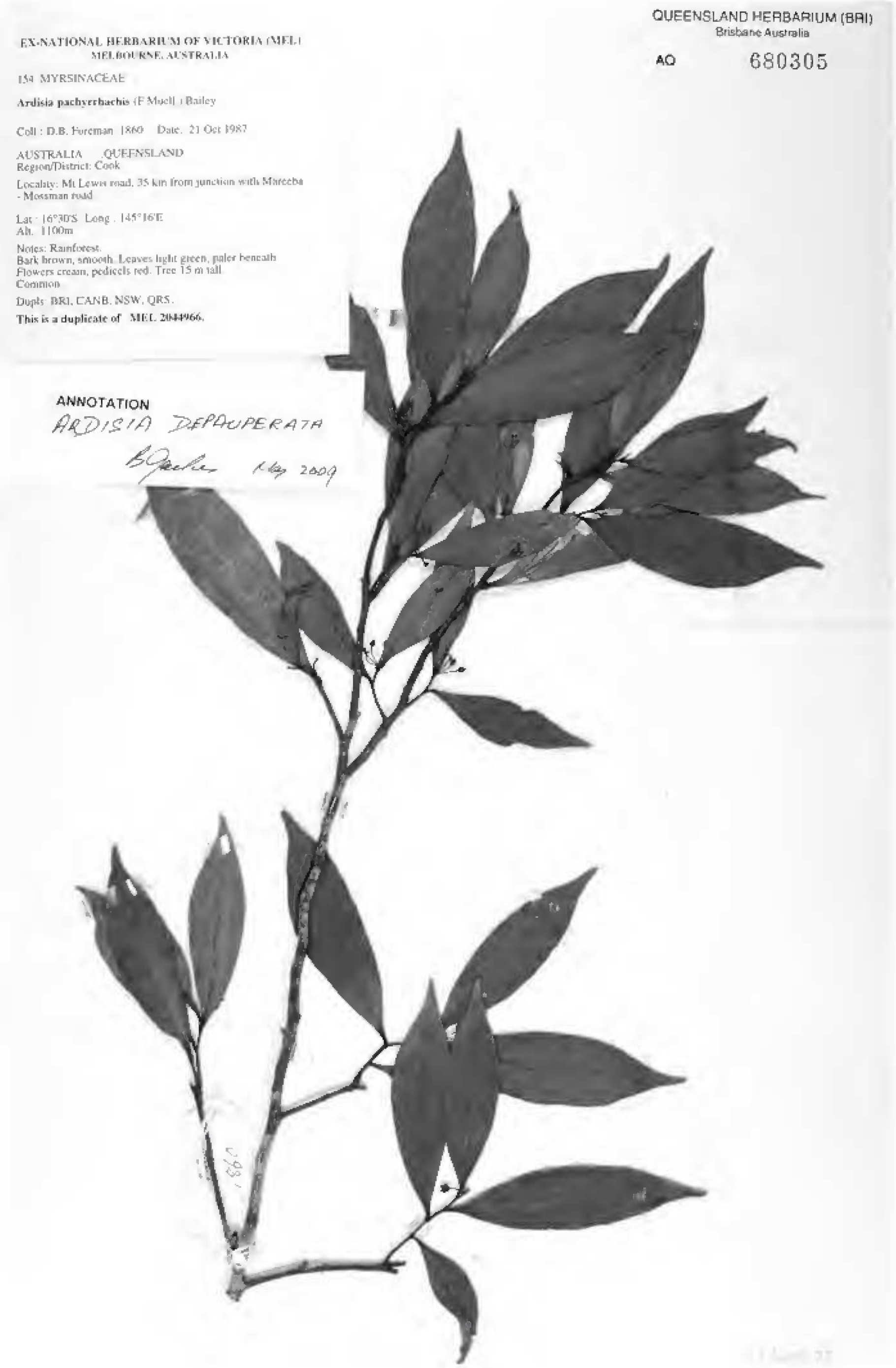
ANNOTATION
ARDISIA CRENATA
B Jackes May 2004

Det. 149.0 Myrsinaceae
Dups.
*May be cited as computerised collection number AQ 490726
(Archival Paper)

QUEENSLAND HERBARIUM (BRI)
Brisbane Australia
AQ 490726

Accepted Name

Fig. 3. Representative specimen of ***Ardisia crenata*** (*Bean 16671* [BRI]).



EX-NATIONAL HERBARIUM OF VICTORIA (MEL)
MELBOURNE, AUSTRALIA

154 MYRSINACEAE

Ardisia pachyrrhachis (F.Muell.) Bailey

Coll.: D.B. Foreman 1860 Date. 21 Oct 1987

AUSTRALIA QUEENSLAND
Region/District: Cook

Locality: Mt Lewis road, 35 km from junction with Mareeba - Mossman road

Lat.: 16°30'S Long.: 145°16'E
Alt. 1100m

Notes: Rainforest.
Bark brown, smooth. Leaves light green, paler beneath.
Flowers cream, pedicels red. Tree 15 m tall.
Common

Dupls: BRI, CANB, NSW, QRS.

This is a duplicate of MEL 2044966.

QUEENSLAND HERBARIUM (BRI)
Brisbane Australia

AQ 680305

ANNOTATION
ARDISIA DEPAUPERATA
May 2009

Fig. 4. Representative specimen of ***Ardisia depauperata*** (*Foreman 1860* [BRI]).

***Etymology*:** The name refers to the markedly crenate margin of the leaves.

4. Ardisia depauperata (Domin) Jackes **status nova**; *Ardisia brevipedata* ?var. *depauperata* Domin, *Biblioth. Bot.* 89: 502 (1928). **Type:** Queensland. Cook District: montes Bellenden-Ker ["Ein Strauch in der mittleren Region des Bellenden-ker"], December 1909, *K.Domin 7657* (holo: PR530275 [photograph seen, photos at BRI, CANB, CNS and NSW]).

Ardisia sp. (South Mary LA B.P.Hyland 8778) (Bostock & Holland 2007).

Shrub or small tree 1.5–4 m tall; bark smooth; stems often sprawling with adventitious roots, branchlets usually zig-zag. Leaves alternate, petiolate; petiole 1–3(–4) mm long, reddish, weakly marginate, flat on adaxial surface. Lamina chartaceous, lanceolate to elliptic, often slightly asymmetrical, (4.6–)6.3–9.1(–11.2) cm long, 1–2.1(–3) cm wide, adaxial surface glossy green, abaxial surface paler, glabrous except for scattered scales; apex acuminate to obtuse, base cuneate, margins smooth, midrib shallowly depressed on adaxial surface, raised on abaxial surface; lateral veins relatively inconspicuous when fresh, more than 15 per side of midrib. Glands pellucid when fresh, appearing black when dry, from irregularly globular to lineate, length:breadth ratio usually less than 3:1. Inflorescence axillary, subumbellate to 1 cm long; flowers 4–8 per inflorescence; peduncles 2–4 mm long, reddish; pedicels filiform, 5–10 mm long, reddish, glands shortly lineate, dark red often appearing black; subtending bracts soon caducous, 1–1.5 mm long, 0.5–1 mm wide, glands dark-coloured. Flowers 5-merous, 2–2.5 mm long. Calyx 5-lobed; tube 0.25–0.5 mm long, broadly triangular; lobes spreading after anthesis, broadly triangular, *c.* 0.5 mm long, 0.5–0.75 mm wide, margins scarious, glands globular to shortly lineate, mostly dark red, occasionally some small globular, orange glands near margin. Corolla rotate, white to cream often with a pink tinge; tube *c.* 0.5 mm long, lobes spreading after anthesis to 1.5–2(–2.5) mm long, 1–1.5 mm wide, apex often weakly reflexed, glands dark red often appearing black, chiefly lineate, length variable, occasional small globular orange gland near margin. Stamens opposite the petals, connivent around the style; base of filaments fused to form a rim that is fused to corolla-tube, uniseriate hairs present on rim, free portion of filament *c.* 0.2 mm long; anthers *c.* 1.5 mm long and 1 mm wide at base, apex apiculate. Ovary globose, 0.75–1 mm diameter, tapering into style, dark-coloured. Style *c.* 1.5 mm long, shallow ridges present, red when fresh, no glands observed; stigma punctiform. Ovules uniseriate, 3 or 4 ovules embedded in placenta, only 1 maturing. Fruit globular to depressed globular, 5–6 mm diameter, red at maturity, glands dark red, usually dense. Seed globular, 4–5 mm diameter, testa brown. **Fig.4.**

***Additional selected specimens (from c. 23 examined)*:** **Queensland.** Cook District: S.F.R. 144, Fantail L.A. Mt Windsor Tableland, Mar 1981, *Unwin 757* (CANB, CNS, NSW); S.F.R. 144, Mt Windsor, Jul 1976, *Unwin 15* (CNS); Mt Spurgeon, Sep 1936, *White 10597* (BRI); Root's Creek, Jan 1936, *Flecker s.n.* (CNS1984); S.F.R. 143, South Mary L.A., May 1976, *Hyland 8778* (BRI, CANB, CNS, NSW); Mt Lewis road, 35–36 km from Rex Highway, Carbine L.A., Aug 1986, *Weston 656 et al.* (BRI, CNS, NSW); S.F.R. 143, South Mary L.A., Feb 1974, *Hyland 7206* (CNS); Mt Lewis road, 35 km from junction with Mareeba – Mossman road, Oct 1987, *Foreman 1860* (BRI, CANB, CNS, MEL, NSW); Druggies track, Leichhardt L.A., T.R. 66, 11 km along Mt Lewis road, Jun 1995, *Forster PIF16761 et al.* (BRI); T.R. 66, Mt Lewis, Aug 1078, *Moriarty 2413* (CNS); Tinaroo Range, Aug 1971, *Moriarty 806* (BRI, CANB); Head of Robson Creek, 5.8 km past hoop pine triangle, NE end of Tinaroo Dam, Mar 1988, *Forster PIF3933 et al.* (BRI, CANB); S.F.R. 185, Edith L.A., Mar 1975, *Irvine 1254* (BRI, NSW); S.F.R. 194, Barron, Sep 1992, *Hyland 14567* (CNS, NSW); Mt Bellenden Ker, 1887, *Sayer s.n.* (MEL1612570); Tarzali, Feb 1918, *White s.n.* (BRI [AQ91824], CANB262869).

***Distribution and habitat*:** This understory shrub or small tree has only been collected in or associated with rainforest, chiefly at altitudes above 800 m. It is endemic to the Wet Tropics of North Queensland. Although not widely collected it is probably more common than collections indicate. It has been recorded in areas between the Mount Windsor Tableland area (16°12′S) south to the Evelyn Tableland area (17°35′S) (**Map 4**).

***Phenology*:** Flowering specimens have been collected most months of the year but particularly in summer and autumn. Fruiting specimens chiefly collected from May to August.

***Notes*:** This species may be distinguished from the related species *Ardisia brevipedata*, by the reduced number of flowers per inflorescence (4–8 versus 12–25) and by the usually smaller flowers. The distribution of these two species overlap within the Wet Tropics; however, *A. brevipedata* is more widespread. Although there is an overlap in leaf size, the leaves in this species are generally smaller than in *A. brevipedata.* Sterile herbarium material may be difficult to assign; however, little difficulty has been experienced in the field. An excellent collection is *Hyland 8778* and in the absence of the type in Australia this collection should be used as a reference, together with photos of the type specimen which have been lodged at BRI, CANB, CNS and NSW.

***Etymology*:** From the Latin *depauperatus* – reduced, starved, referring to the smaller number of flowers in the inflorescence.

5. Ardisia elliptica Thunb., *Nov. Gen. Pl.* 8: 119 (1798). **Type:** Sri Lanka (holo: UPS-Thunberg herbarium, sheets 5320, 5321 [microfiche seen]).

Shrub or small tree to 4 m tall, bark grey; branchlets somewhat angular, glabrous, young growth reddish. Leaves spirally arranged, petiolate; petiole (2–)5–12(–15) cm long, reddish, marginate, usually flat on adaxial surface; lamina chartaceous, oblanceolate to elliptic-lanceolate, (5–)8–13.2 cm long, (1.4–) 3–4.6 cm wide, adaxial surface glossy green, abaxial surface paler, glabrous except for some scattered scales; apex obtuse to acuminate, base cuneate, margins smooth, midrib flat or slightly depressed on adaxial surface, raised on abaxial surface; lateral veins relatively inconspicuous, 20–34 pairs on either side of the midrib, looping near the margin to form an intramarginal vein; glands globular to shortly lineate, length:breadth ratio to 4:1, pellucid when fresh drying to orange-red or red, visible as bumps on both surfaces of dried leaves. Inflorescence terminal or subterminal, umbellate to subumbellate, 4–5 cm long, flowers 6–11 per inflorescence; peduncle reddish 2–3.5 cm long; pedicels 8–17 mm long, often curved, reddish and pellucid glands drying red; subtending bracts to 2 × 2 mm, soon caducous. Flowers 5-merous, to 10 mm long. Calyx 5-lobed, green; tube 0.5–1 mm long; lobes rounded, 1.5–3mm long, 1.5–2 mm wide at base, margins scarious and ciliolate, glands irregular drying red to very dark red. Corolla rotate, pale pink; corolla-tube *c.* 1 mm long, lobes spreading after anthesis, 7–9 mm long, 3–4 mm wide, glands drying reddish, dots or short streaks. Stamens opposite the petals; filaments *c.* 2 mm long, fused at base to form a short tube *c.* 0.5 mm long which weakly adheres to the corolla-tube and may alternate with 1–5 pink petaloid staminodes to 1 mm long; anthers connivent around the exserted style, 4–5 mm long and 1.5 mm wide tapering to an apiculate apex, septate, opening by introrse longitudinal slits, dark red glands obvious on the back. Ovary globular, *c.* 1 mm diameter, tapering to the style glands present; ovules multiseriate, 17–20 embedded in the placenta; style 5–9 mm long, glands prominent, stigma punctiform. Fruit depressed globular, 6–8 mm wide, 5–7 mm high, fleshy, green to dark pink to black at maturity. Seed, 5 mm diameter; testa brown, with pinkish tinge when fresh. *shoebutton Ardisia.* **Fig. 5.**

***Additional selected specimens (from c. 20 examined)*:** **Northern Territory**. Nhulunbuy, Town Lagoon, May 1996, *Cowie 7045* (BRI). **Queensland**. Cook District: Weipa Campground, Apr 2004, *Waterhouse BMW6845* (BRI); Cassia Street, Edge Hill, Cairns, Apr 2001, *Woodward s.n.* (BRI [AQ669650]); Kennedy Highway, Atherton, Aug 2002, *Willets s.n.* (CNS123780); Babinda, Mar 1998, *Jago 780* (CNS). South Kennedy District: Slade Point, Dunal System, Jun 1992, *Champion 727* (BRI). Moreton District: Calamvale south of Brisbane, 1975 Beaudesert Road, Jul 2000, *White s.n.* (BRI [AQ 490024]).

***Distribution and habitat*:** Originally found in Thailand, Vietnam, China, Taiwan, Japan, Philippines and Indonesia, this species has becomes a serious weed in many countries particularly on many Pacific Islands and in southern Florida (PIER 2008). In Australia it is naturalised in the Northern Territory and Queensland (**Map 5**). It prefers moist areas particularly in rainforest and associated areas. The black drupes are attractive to birds that disperse the seeds.

***Phenology*:** Flowering occurs mainly in spring and summer. Fruits have been commonly collected in the late summer to late winter period.

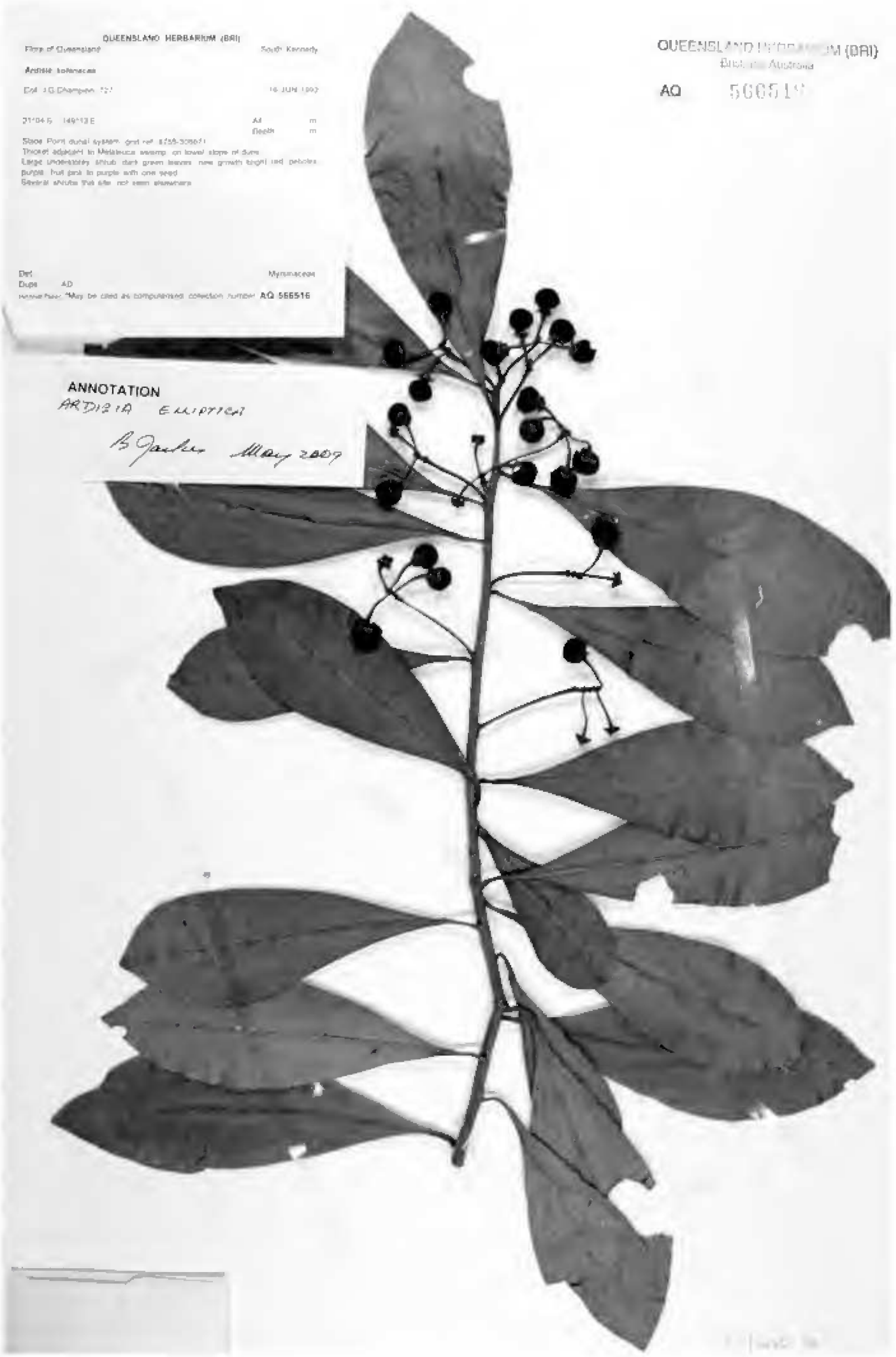


Fig. 5. Representative specimen of ***Ardisia elliptica*** (*Champion 727* [BRI]).

***Notes*:** This species has been frequently misidentified and confused with both *A. humilis* Vahl and *A. solanacea* Roxb. Mez (1902) included *A. elliptic*a Thunb., under *A. humilis*; although based on the original descriptions, they both have quite different inflorescences. A further source of confusion probably arose because Willdenow's specimens of *A. solanacea* represent two different species. Mez (1902) places Willdenow herb., number 4883 under *A. humilis* and number 4883 under *A. solanacea* Roxb. *Ardisia elliptica* Bedd., is also a synonym of *A. solanacea* Roxb.; however, *A. elliptica* Thunb., *A. humilis* Vahl and *A. solanacea* Roxb., are all valid species and may be easily distinguished as follows.

***Etymology*:** unknown.

A. elliptica	Branchlets angular; petioles marginate, 0.5–1 cm long; glands in lamina pellucid when fresh, drying red when viewed with reflected light, 12–34 lateral veins on each side of midrib, marginal vein present; inflorescence axillary, subumbellate to umbellate; glands in corolla red.
A. humilis	Branchlets terete; petioles caniculate, 0.6–1 cm long; glands in lamina pellucid, inconspicuous, *c.* 12 pairs of lateral veins each side of midrib, marginal vein absent; inflorescence terminal or subterminal paniculate; glands in corolla pellucid to orange-coloured.
A. solanacea	Branchlets prominently angled; petioles caniculate, 1–2 cm long; glands in lamina black, conspicuous, c. 20 pairs of lateral veins on each side of the midrib, marginal vein absent; inflorescence both terminal and axillary, paniculate to corymbose; glands in corolla dark red to black.

Detailed descriptions of both *A. humilis* Vahl and *A. solanacea* Roxb. may be found in Chen & Pipoly (1995).

6. Ardisia fasciculata C.T.White, *Proc. Roy. Soc. Queensland* 50: 80 (1939). **Type:** Queensland. Cook District: Mt Spurgeon, September 1936, *C.T.White 10673* (holo: BRI [AQ23414]).

Shrub or small tree. Leaves, alternate, spirally arranged, petiolate; petioles terete, 10–17 mm long; lamina coriaceous, broadly lanceolate to obovate, 7–10 cm long, 2.5–4 cm wide, glabrous on both surfaces except for peltate glandular scales on the abaxial surface; apex obtuse, base cuneate, margins entire, undulate, may be weakly revolute; midrib depressed on adaxial surface and raised on abaxial surface, lateral veins inconspicuous but visible on both surfaces when dry; glands not visible in dried leaves. Inflorescence an axillary fascicle, 3–6 flowered; peduncle *c.* 0.2 mm long; pedicels thick, angular 6–7 mm long and *c.* 1.5 mm wide, glands difficult to distinguish. Flowers 5-merous, *c.* 5 mm long; calyx campanulate; tube 0.75–1mm long, lobes triangular, 1.25–1.75 mm long, 1.25–1.75 mm wide at base, margins with glandular papillae, glands small, dark red. Corolla rotate; tube *c.* 2 mm long, lobes *c.*1.5 mm long, densely papillate. Stamens equal in length to corolla; filaments flattened; anthers narrowly ovate, *c.* 1 × 1 mm. Ovary conical, *c.* 1 × 1.5 mm, glabrous, glands dark, stylar remains darkish. Ovules multiseriate, *c.* 14. Fruit not seen. **Fig. 6.**

***Distribution and habitat*:** Known only from the type specimen, a small tree collected in rainforest on Mt Spurgeon, North Queensland. Despite some recent excursions to the area no additional specimens has been located.

***Phenology*:** When C.T. White collected the plant in September he noted that it was just past flowering; however, closer examination found that there were remains of the corolla on some of the flowers.

***Notes*:** Regarded by White (1939) as a very distinctive species because of the thick short peduncle so that the flowers appear to be clustered in the axils of the subtending leaves. This description has been compiled from an examination of the type specimen

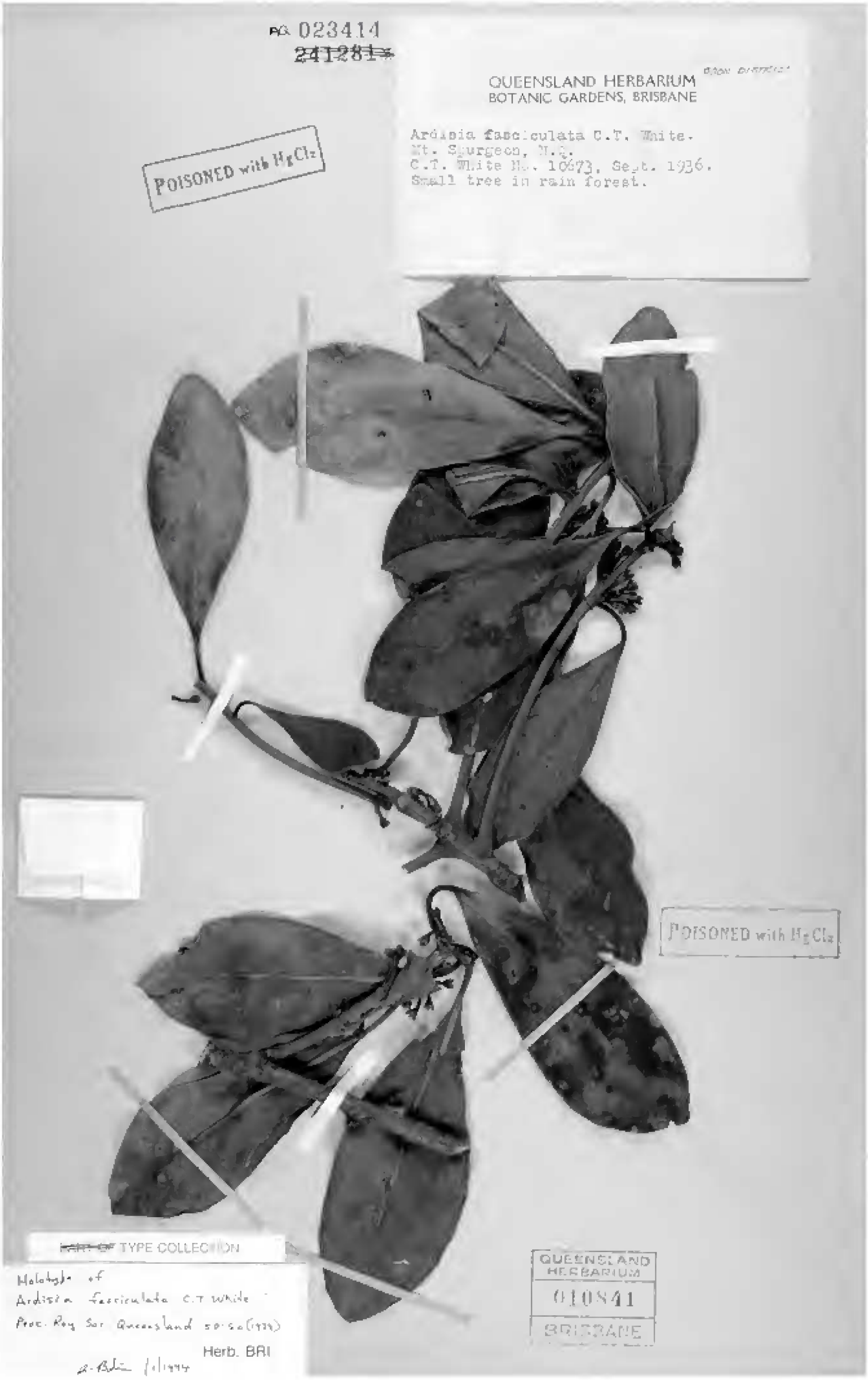

AQ 023414
~~241281~~
QUEENSLAND HERBARIUM
BOTANIC GARDENS, BRISBANE
Ardisia fasciculata C.T. White.
Mt. Spurgeon, N.Q.
C.T. White No. 10673, Sept. 1936.
Small tree in rain forest.
POISONED with HgCl2
POISONED with HgCl2
~~PART OF~~ TYPE COLLECTION
Holotype of
Ardisia fasciculata C.T White
Proc. Roy Soc Queensland 50:50 (1939)
Herb. BRI
1/1/1994
QUEENSLAND HERBARIUM
010841
BRISBANE

Fig. 6. Holotype specimen of ***Ardisia fasciculata*** (*White 10673* [BRI]).

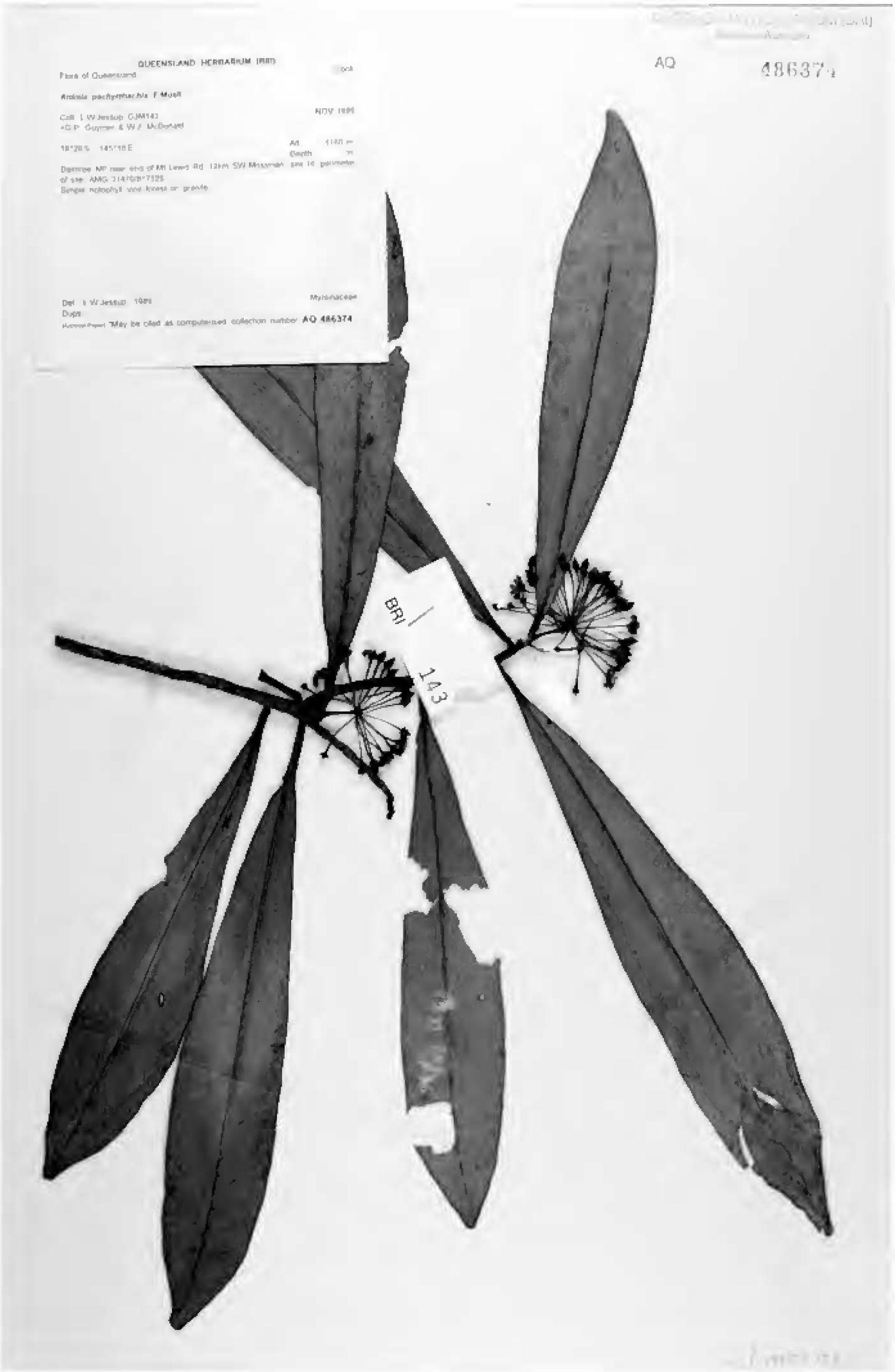


Fig. 7. Representative specimen of ***Ardisia pachyrrhachis*** (*Jessup, Guymer & McDonald GJM143* [BRI]).

combined with the original description and notes by C.T.White. Details of the style were unavailable because of the nature of the specimen. It is the only species seen where the corolla lobes are shorter than the tube, its taxonomic position thus remains unclear until additional fertile material is obtained. It differs from both *Ardisia brevipedata* and *A. pachyrrhachis* in the number of ovules and the short thickened peduncle and pedicels, as well as the corolla lobes much shorter than the tube.

***Etymology*:** From the Latin *fasciculus* – fascicle or cluster and refers to the flowers being clustered in the axils of the subtending leaf.

7. Ardisia pachyrrhachis (F.Muell.) F.M. Bailey, *Botany Bull., Dept. Agric. Queensland* 3: 14 (1891). *Bladhia pachyrrhachis* F.Muell., *Vict. Nat.* 8: 15 (1891). **Type:** Queensland. COOK DISTRICT: In the upper region of Mount Bartle Frere, January 1891, *S.Johnson s.n.* (lecto: MEL1612575 [here chosen]; isolecto: BRI [AQ23416], K, MEL1612573; P *n.v.*).

***Illustration*:** Cooper & Cooper (2004: 335).

Shrub or small tree, 1–5(–7) m tall, sparsely branched; bark smooth; branchlets angular, reddish-purple when young, scars obvious. Leaves alternate, petiolate; petiole (2–)5–10 mm long, purplish-red, marginate, flat on adaxial surface. Lamina coriaceous, obovate, 7.7–28.5 cm long, (1.7–)2.3–8.3 cm wide, adaxial surface dull green, abaxial surface paler, glabrous except for scattered scales; apex obtuse to acuminate, base cuneate, margins smooth, usually recurved, midrib depressed on adaxial surface, raised on abaxial surface, purplish-red in colour when fresh, lateral veins relatively inconspicuous particularly when fresh, more than 20 per side; glands in reflected light, pellucid when fresh, red on oxidation, externally appearing black when dry, irregularly globular to lineate, with a length:breadth ratio up to 50:1. Inflorescence axillary, racemose to subumbellate or umbellate, to 4 cm long; peduncles thick, 5–11 mm long, (1–)2–5 mm wide, reddish; rhachis 2–10 mm long, flowers (10–)19–44 per inflorescence; pedicels filiform, often curved, reddish 10–23 mm long, glands appearing black; subtending bracts soon caducous, to 10 mm long and 4 mm wide, scars persistent, glands shortly lineate, appearing black. Flowers 5-merous, 4–5 mm long. Calyx 5-lobed; tube 0.2–03 mm long, lobes broadly triangular to broadly ovate, 0.75–1 × 1–1.5 mm, spreading after anthesis, margins scarious, glands dense, dark red to black, but near margin they are often small, globular and orange-red so calyx usually appears almost black when dry but dark pink when fresh. Corolla white, cream or pale pink; tube *c.* 0.5 (–1.5) mm long; lobes twisted in bud, spreading after anthesis to 3.5–4 mm long, *c.* 1.5 mm wide, apex reflexed, margins scarious, inner surface with scattered uniseriate ferruginous hairs, glands dark red, irregularly globular to shortly lineate. Stamens opposite the petals, connivent around the style; base of filaments fused to form a rim fused to corolla-tube, uniseriate ferruginous hairs dense on rim, free portion of filament to *c.* 0.3 mm long; anthers cordate-sagittate, *c.* 2 mm long, 1–1.5 mm wide at base, glands absent, apex apiculate. Ovary globose, *c.* 1.5 mm diameter, tapering into style, pink when fresh. Style usually twisted, 2–3 mm long, pink, glands dark, stigma punctiform. Ovules uniseriate, 4, embedded in placenta. Fruit globular to depressed-globular, 5–8 mm diameter, bright red at maturity, style persistent, glands shortly lineate dark-coloured. Seed depressed–globular, 4–5 × 6 mm, testa brown. *mountain Ardisia.* **Fig. 7.**

***Additional selected specimens (from c. 107 examined)*:** **Queensland.** COOK DISTRICT: Upper Parrot Creek, Annan River, Sep 1948, *Brass 20239* (BRI, CANB); Gap Creek, *c.* 38 km S of Cooktown (9 km by road from Rossville), Sep 1960, *Smith 11231* (BRI); T.R. 146, Tableland L.A., Sep 1980, *Hyland 10583* (CNS); Mt Misery on Mt Carbine Tableland, Sep 1972, *Webb & Tracey 10823* (BRI, K); Mt Hemmant just N of Noah Creek in Cape Tribulation area, Jul 1973, *Webb & Tracey 11726* (BRI); S.F.R. 144 Whypalla, Bowerbird L.A., Feb 1988, *Hyland 13506* (CNS); S.F.R. 144, Western edge of Windsor Tableland, Nov 1971, *Dockrill 301* (BRI, CNS); S.F.R. 143 Kanawarra, Carbine T.R., May 1995, *Gray 5936* (CNS); Daintree N.P., near end of Mt Lewis road, 12 km SW of Mossman, Nov 1988, *Jessup GJM143 et al.* (BRI); Mt Lewis road, 28–29 km from Rex Highway, Aug 1986, *Weston 602 et al.* (BRI, NSW); 8 km along Mt Lewis road from the junction with Mareeba to Mossman road, Oct 1987, *Foreman 1676* (AD, BRI, CANB, CNS, MEL, NSW); T.R. 66, Mt Lewis, Sep 1978, *Moriarty 2465* (BRI, CNS); Murray Prior Range, tributary of Hills Creek, Dec 1990, *Lyons 87* (BRI); *ibid*, *Lyons 88* (JCT); North Bell Peak, upper western slopes, Malbon Thompson Range, Jun 1996, *Forster PIF18014 et al.* (BRI, CNS); Wooroonooran N.P., Mt Bellenden Ker summit, Dec 2001, *Forster PIF27938 et al.* (BRI); Boonjee L.A., near Bartle Frere track S of Bobbin Bobbin Falls, 5.4 km NE Boonjee, Oct 1988, *Jessup GJM338 et al.* (BRI); Babinda Creek, Oct 2000, *Jago 1255* (CNS); Mt Bartle Frere, South Peak, Mar 1997, *Gray 7130* (CNS); Russell River, 1892, *Johnson s.n.* (MEL1612571); Mourilyan Harbour, Feb 1890, *Bailey s.n.* (BRI [AQ91568]).

***Distribution and habitat*:** Rainforest understory shrub or small tree, found from south of Cooktown (15°30′S) to the Mt Bartle Frere and Innisfail area south of Cairns (17°30′S) (**Map 6**). Altitude from sea-level to 1500 m although most collections have been made above 400 m altitude.

***Phenology*:** Neither flowers nor fruits have been collected from May to July inclusive.

***Notes*:** This species is similar to *Ardisia brevipedata* but can be distinguished by the adaxial surface being dull rather than a glossy green; the robust inflorescence and the flowers usually more numerous, (in *A. pachyrrhachis* (10–)19–45 versus 12–25 in *A. brevipedata*).

Foliicolous lichens are common on the adaxial surface of the older leaves and leafy liverworts are also often present.

***Etymology*:** The specific epithet refers to the thick peduncle of the inflorescence and is derived from the Greek *pachys* - thick or stout, and *rach-* main axis.

8. Ardisia sanguinolenta Blume, *Bijdr.* 685 (1826). **Type:** Java. *s.dat.*, *Blume s.n.* (holo: L900.211-170).

Ardisia colorata Roxb., *Fl. Ind.* ed. Carey, 2: 271 (1824), *nom. illeg. non* Link (1821). **Type:** Illustration, W. Roxburgh *Icon.* No. 2126 (K).

***Illustrations*:** Du Puy (1993: 180, figs. 41F–H), Claussen (2005: 63), all as *A. colorata*.

***Notes*:** This species has been known as *Ardisia colorata* for over 170 years (e.g. Larsen & Hu 1996). Recently these authors established that *A. sanguinolenta* Blume was the correct name for this species and that *A. colorata* should be placed in synonymy (Larsen & Hu 2001).

This variable species is found on Christmas Island and is distributed from India and southern China east to Java. The Christmas Island specimens of this species can be distinguished from Asian material by the young stems being slightly winged. A description of this species may be found in Du Puy (1993) as *A. colorata*.

Taxonomy of *Tetrardisia*

Tetrardisia was erected by Mez (1902) to accommodate a single species (*Ardisia denticulata* Blume) which had 4-merous flowers and less than 10 ovules. Stone (1989) considered *Tetrardisia* to be a valid genus with three species distributed from the Malay Peninsula through Borneo and Java. These species, *Tetrardisia corneri* Furtado, *T. porosa* (C.B.Clarke) Furtado, and *T. tetrasepala* (King & Gamble) Furtado, together with *T. denticulata* (Blume) Mez are all 4-merous and have 6 or 7 ovules in one series. Larsen & Hu (1995) placed *Tetrardisia* in synonymy under *Ardisia* but at the rank of subgenus. Ståhl & Anderberg (2004) again recognized *Tetrardisia* as a valid genus. However, neither Stone (1992) nor Larsen & Hu (1995) mentioned the Australian taxon described as *Tetrardisia disticha* by Domin (1928) and which is synonymous with *Tetrardisia bifaria*.

Thus, currently after including a species from Thailand described by Larsen & Hu (1991) as *A. tetramera* Larsen & Hu, there are at least six species in this genus. Another species with 4-merous, unisexual flowers described by Stone (1982) as *Tetrardisia fruticosa* B.C.Stone, was subsequently transferred by him to *Systellantha* B.C.Stone (Stone 1992).

Tetrardisia Mez in Engler, *Pflanzenr.* 9(IV.236): 189 (1902); *Ardisia* subgenus *Tetrardisia* (Mez) K.Larsen & C.M.Hu, *Nord. J. Bot.* 15: 162 (1995). **Type:** *Tetrardisia denticulata* (Blume) Mez. (syn: *Ardisia denticulata* Blume).

Shrubs or small trees to 3 m tall, often slender. Leaves sessile, subsessile to petiolate (non-Australian); lamina usually elliptic to lanceolate; margins crenate, serrulate or more or less entire, abaxial surface glabrous or pubescent; glands dark-coloured, chiefly globular. Inflorescences axillary or terminal racemes or panicles (non-Australian) with 4–20 flowers per inflorescence. Flowers bisexual, 4-merous; pedicels thin, papillate, reddish glands usually associated with all parts; calyx free or fused at base, margins often papillate; corolla rotate, white to pink, shortly fused at base, lobes imbricate in bud overlapping to the right. Stamens free or inserted near the base; filaments very short; anthers sagittate, introrse, 2-locular, opening by longitudinal slits. Ovary superior, globose to subglobose; style filiform more than twice length of ovary, stigma punctiform. Ovules few, embedded in placenta, 2–4-seriate in a single level. Fruit a drupe, globose; seed 1.

Etymology: From Greek *tetra* - four and *Ardisia* the genus, referring to the 4-merous flowers.

Tetrardisia bifaria (C.T.White & W.D.Francis) C.T.White, *Bull. Misc. Information Kew* 45 (1933); *Ardisia bifaria* C.T.White & W.D.Francis, *Proc. Roy. Soc. Queensland* 35: 73 (1924). **Type:** Queensland. Cook District: Bellenden Ker, March 1922, *C.T.White 1308* (holo: BRI [AQ23413]; iso: K).

Tetrardisia disticha Domin, *Biblioth. Bot.* 89: 504 (1928). **Type:** Queensland. Cook District: Bellenden Ker, December 1909, *K.Domin s.n.* (PR *n.v.*).

Illustration: Cooper & Cooper (2004: 334).

Erect understory shrubs to 2 m tall, although usually much shorter, much-branched, subverticillate; branchlets terete, weakly zig-zag, glandular papillae and sessile glandular, reddish scales present, very small leaves common near base of branchlets, young growth pink. Leaves distichous, sessile to subsessile; petiole absent or minute, if present often papillate; lamina chartaceous to coriaceous, oblong-lanceolate to obsubulate, (0.6–)3–10.5 cm long, (0.3–)1–1.9 cm wide, often somewhat assymmetrical, adaxial surface dull green, glabrous abaxial surface paler with scattered, reddish glandular scales; apex acuminate to obtuse, base cordate and clasping the stem, margins entire or occasionally some minute teeth present, often reddish when fresh; midrib deeply depressed on adaxial surface, prominently raised on abaxial surface, reddish, glandular papillae sometimes present particularly towards the base; lateral veins inconspicuous looping towards the margin but not forming a continuous marginal vein, number varies with length of leaf, usually from between 16 to 30 on either side of the midrib; glands irregularly globular, reddish, randomly distributed, may be visible as bumps on the adaxial surface. Inflorescence an axillary raceme *c.* 1.5 cm long, flowers 4–8, peduncle 0.8–2 mm long, reddish; pedicels often appear to arise from almost the same point, pedicels filiform, 4–8 mm long, reddish, glandular papillae may be present; subtending bracts chartaceous, oblong, soon caducous 1–2 mm long, 0.5–1 mm wide at base, glands not observed. Flowers *c.* 3 mm long. Calyx green; tube 0.5–0.75 mm long, lobes triangular, *c.* 1.5 mm long, 0.2–0.5 mm wide at base, glands few, irregularly globular, red. Corolla green to white; corolla-tube *c.* 0.2 mm long; lobes widely spreading after anthesis, *c.* 3 mm long and 2 mm wide at base, margins inflexed towards the apex, uniseriate pale-coloured hairs present at junction of tube and lobes; glands shortly lineate light to dark red in median area only. Stamens antepetalous, base of filaments fused to form a very short rim, free portion subsessile, flattened, 0.1–0.3 mm long; anthers cordate at base, tapering into a short point,1.75–2 mm long, 1–1.5 mm wide at base, connective reddish, no glands observed. Ovary 0.75–1 mm diameter, tapering into the style, glands red; style 2–3 mm long twisted, stigma glands if present red. Ovules uniseriate, 2–4. Fruit 5–6 × 6 mm, bright red at maturity, endocarp ribbed; glands globular to lineate dark red. Seed globular, *c.* 5 mm diameter, testa brown. *miniature spearflower*. **Fig 8**.

***Additional selected specimens (from c. 42 examined)*:** **Queensland.** Cook District: S.F.R. 310, upper Goldsborough L.A., 17 km SE of Mulgrave township, Site 34, Nov 1988, *Jessup GJM1831 et al.* (BRI); S.F.R. 310, Nov 1992, *Irvine 2352* (CNS); The Boulders, Babinda, Jun 1999, *Gray 7574* (CNS); The Boulders, Babinda, Jun 1997, *Jago 651* (CNS); Start of Bartle Frere walking track, Dec 2001, *Booth 2789 & Jensen* (A, BRI, MEL); T.R. 1230, Wonaroo Creek catchment, upper Russell River, 1972, *Tracey 15497* (BRI, DNA, LAE, PNH); Westcott Road, Topaz, Jan 1996, *Cooper 960 & Cooper* (CNS); Wooroonooran N.P., Tableland section near zig-zag, Oct 2000, *Forster PIF26309 et al.* (BRI); S.F.R. 755,

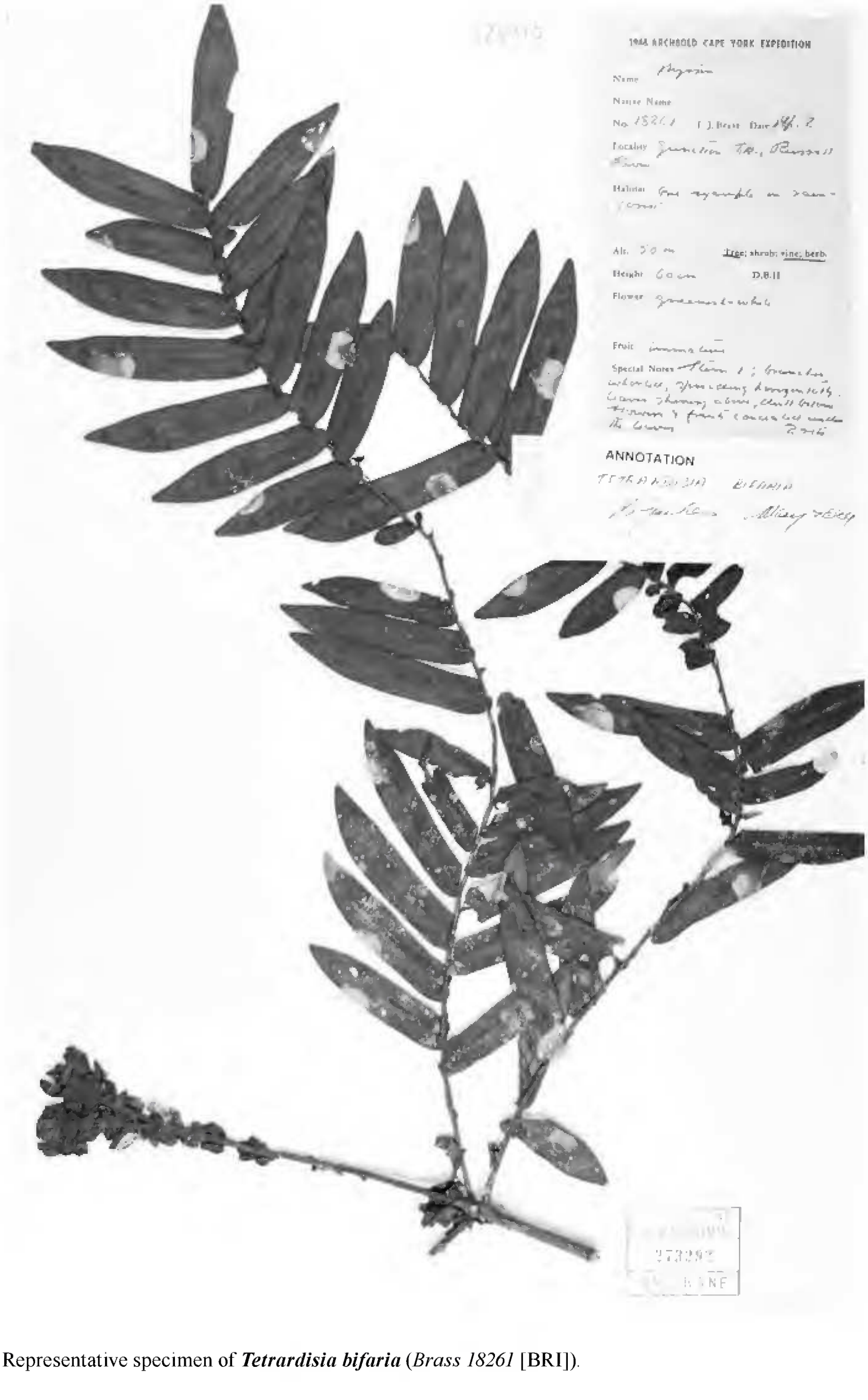


Fig. 8. Representative specimen of ***Tetrardisia bifaria*** (*Brass 18261* [BRI]).

Gosschalk L.A., Mar 1995, *Gray 6020* (CNS); S.F.R. 755 Bartle Frere, Gosschalk L.A., Nov 1991, *Hyland 14340* (BRI, CNS); Near Topaz, Feb 1990, *Nicholson s.n.* (CNS 93290); N.P. 226, Bartle Frere zig-zag track from Russell River to Towalla, 250 m from river, Sep 1993, *Bostock 1467 & Turpin*, (BRI); Junction track, Russell River, Apr 1948, *Brass 18261* (BRI).

***Distribution and habitat*:** Most collections have been made in rainforest associated with Mt Bartle Frere and Mt Bellenden Ker at altitudes above 600 m. However, several specimens of *Tetrardisia bifaria* have been collected at lower altitudes such as at The Boulders, Babinda (alt. 40 m) and at 220 m in the upper Goldsborough Valley. Although this species has a restricted distribution it chiefly occurs within protected areas (**Map 7**).

***Phenology*:** Flowers have been collected from August to April with a peak occurring in January and February. Fruits recorded from April to November but mature fruits have been chiefly observed in September and October.

***Notes*:** The species is readily distinguished from the Australian *Ardisia* species by the 4-merous flowers and the sessile or subsessile, 2-ranked leaves where the cordate lobes of the leaf base appear to clasp the stem. The flowers and fruits are often difficult to see as they are concealed under the leaves.

***Etymology*:** The specific epithet is from the Latin *bi-* two and *-farius* –ranked, referring to the leaves being two ranked.

Excluded names

Ardisia pseudojambosa F.Muell., *Fragm.* 4: 81 (1864) [=***Tapeinosperma pseudojambosa*** (F.Muell.) Mez, *fide* Jackes (2005)].

Ardisia repandula F.Muell., *Fragm.* 4: 82 (1864) [=***Tapeinosperma repandulum*** (F.Muell.) Jackes, *fide* Jackes (2005)].

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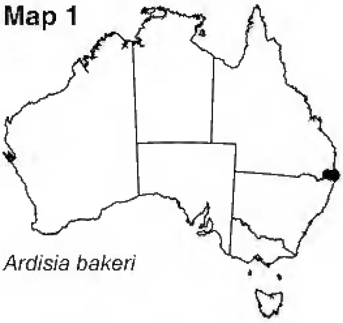
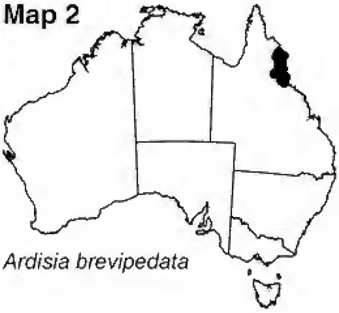
Map 1



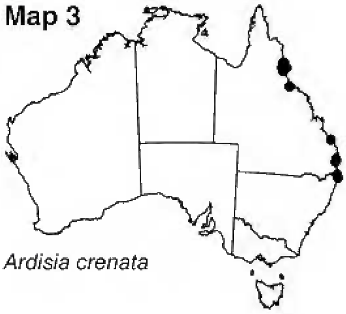
Ardisia bakeri

Map 2



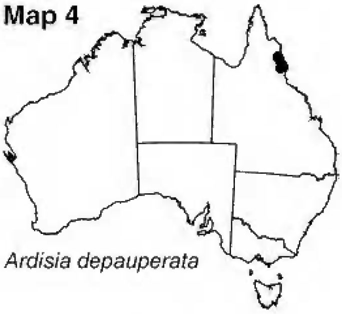
Ardisia brevipedata

Map 3



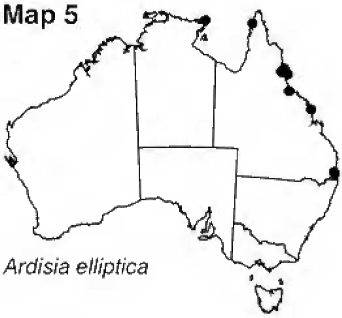
Ardisia crenata

Map 4



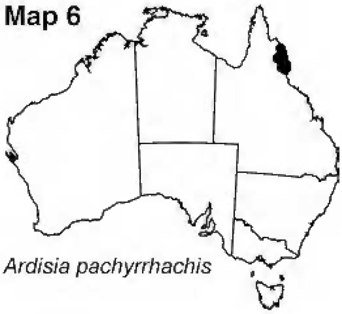
Ardisia depauperata

Map 5



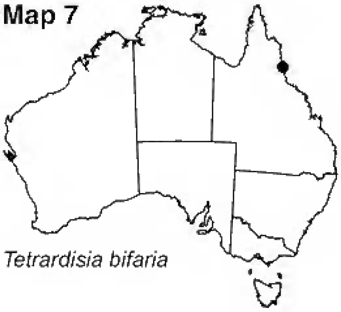
Ardisia elliptica

Map 6



Ardisia pachyrrhachis

Map 7



Tetrardisia bifaria